Not to be cited without prior reference to Marine Scotland, Marine Laboratory, Aberdeen.

MRV *Alba na Mara*

Survey 1313A

**PROGRAMME**

04 – 15 October 2013

**Ports**

**Loading:** Fraserburgh, 27 September 2013
**Unloading:** Fraserburgh, 15 October 2013

In setting the cruise programme and specific objectives, etc the Scientist-in-Charge needs to be aware of the restrictions on working hours and the need to build in adequate rest days and rest breaks as set out in Marine Scotland's Working Time Policy (Lab Notice 34/03). In addition, the Scientist-in-Charge must formally review the risk assessments for the cruise with staff on-board before work is commenced.

In the interest of efficient data management it is now mandatory to return the Cruise Report, to I Gibb and the Cruise Summary Report (old ROSCOP form) to M Geldart, within four weeks of a cruise ending. In the case of the Cruise Summary Report a nil return is required, if appropriate.

**Personnel**

K Summerbell (SIC)
J Hunter
E Lines

**Costs to Project:** 12 days – 20119

**Equipment:**

- BIGG sledge (Benthic Interactions with Ground Gear)
- Ground gear elements and weights
- Rubber matting
- Load cells
- LISST 100X particle size analyser
- Dissolved oxygen sensors
- Conductivity and temperature sensor
- Day grab (including table)
- Video Cameras
- Flashback recorders and housings
- Scanmar (tilt and depth)

**Objectives**

- To estimate horizontal drag forces (hydrodynamic and geotechnical drag) for ground gear shaped objects towed on the sea bed, with different vertical loads.
- To measure the quantity of sediment remobilised by ground gear shaped objects.
- To quantify the effect of sediment remobilisation by ground gear shaped objects on dissolved oxygen levels.

**Protocols:**

*Alba na Mara* will leave Fraserburgh on 4 October and steam towards the site at Dornoch (Fig 1). Sediment samples will be taken with the day grab at the work site. The rest of the survey will be dedicated to sledge sampling experiments. If work is not possible at the Dornoch area, sampling may be transferred to the Lossiemouth area (Fig 1). *Alba na Mara* will return to Fraserburgh on the 14 October, and the scientific personnel and equipment will be unloaded on the 15 October.

**The BIGG Sledge and Ground Gear Components:**

The BIGG sledge has been designed to allow the horizontal drag of the ground gear (hydrodynamic and pelodynamic drag) to be measured via load cells mounted within the framework. The sledge allows weights to be added to the ground gear from 0 -120kg altering the vertical force.

There are four ground gear shapes to be tested on the sledge (200, 300, 400 mm discs and NACA0025 ("Hydro-Hopper")). The shapes are made out of high density polyethylene (HDPE) and will be arranged into three configurations during the cruise (6 objects "spaced", 6 objects together in a "block", 12 objects in a "long block").

The sledge will have a LISST 100X mounted 1.9m behind the ground gear. This will enable particle size and quantity to be measured within the sediment plume created by the ground gear. Two dissolved oxygen sensors will be fitted, one at the front to give control readings and one next to the LISST to give oxygen readings in the plume. Two video cameras will be mounted on the framework of the sledge, one will be angled to verify the ground gear is in contact with the seabed, and the other will show if the LISST and dissolved oxygen sensor is within the sediment plume.

**Sledge Sampling:**

The sledge will be towed off the central warp, with a wire bridle (Fig 2). A dyneema rope will lift the sledge in and out of the water by the deck winch through a block on the gamma frame. Each tow will last 30-40 min. During the tow the speed will be altered at 10 minute intervals (2.5, 3.0 and 3.5 knts - dependent on tide, swell and windage). Once the sledge is back aboard, a quick alteration to either the ground gear or weights will be carried out, before redeploying.

Normal contacts will be maintained with the laboratory.

Submitted:
*K Summerbell*
9 September 2013

Approved:
I Gibb
18 September 2013

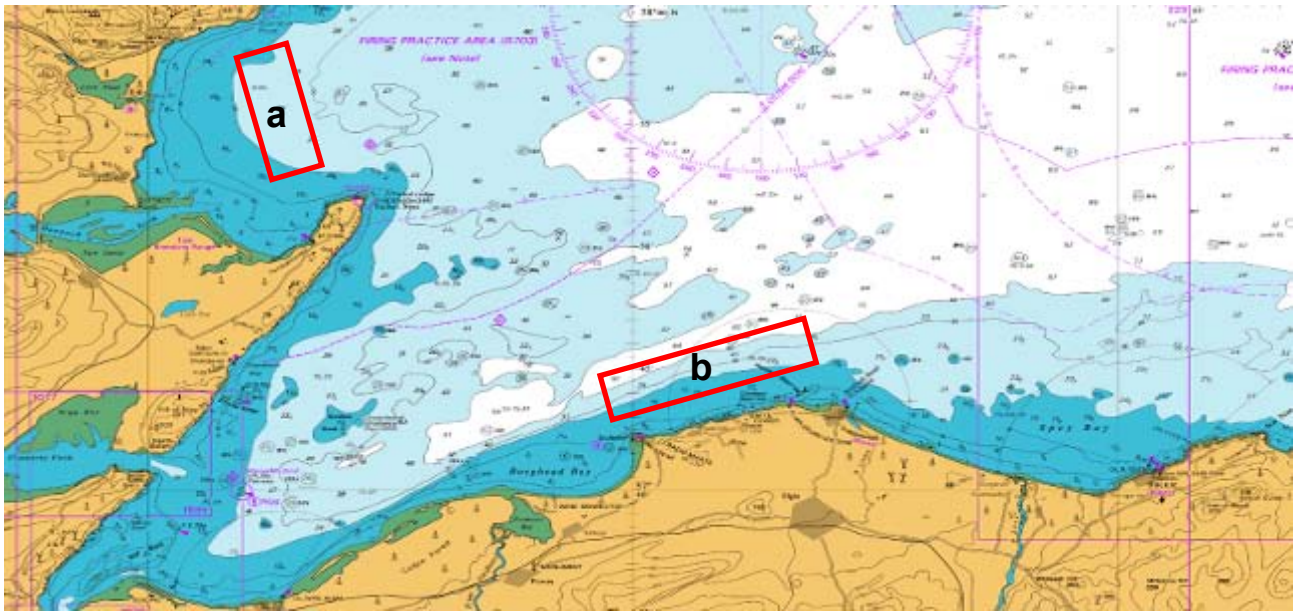


**Figure 1:** Chart of the Moray Firth, with sampling sites at a) Dornoch and b) Lossiemouth indicated.

**Figure 2:** The Bigg sledge with towing bridle and lifting line attached, the ground gear being tested is 400mm discs in the “block” arrangement.